

What Is Claimed Is

- 1. The Contact-type Micro Piezoresistive Shear-Stress Sensor comprising Si substrate, Sensing diaphragm, Protective Membrane and Flange, specially includes two X-shape piezoresistors, each with flanges at four ends, as the primary sensing units.**
- 2. A Contact-type Micro Piezoresistive Shear-Stress Sensor according claim 1, these sensing units consist vertically of: (from bottom to top)**
 - Si substrate:**
 - Sensing diaphragm: formed into the etched cavities at preset locations on the Si substrate;**
 - Protective Membrane: formed on the above-said membranes;**
 - Flange: formed via etching technology at the preset positions on the said Membranes as Shear-Stress sensing components.**
- 3. A Contact-type Micro Piezoresistive Shear-Stress Sensor according claim 1, these material of sensing units consist vertically of: (from bottom to top)**
 - Si substrate: made of High Doping semi-conductor piezoresistive material;**
 - Protective Membrane: made of SiO_2 , Si_3N_4 semi-conductor protective material**
 - Flange: made of the same material as the above-mentioned Protective Membrane.**

4. A Contact-type Micro Piezoresistive Shear-Stress Sensor according claim 1, the cavity structure of the Contact-type Micro Piezoresistive Shear-Stress Sensor, the primary sensing component, is formed by chemical etching solutions or physical etching techniques.
5. A Contact-type Micro Piezoresistive Shear-Stress Sensor according claim 1, Formation of the Flange structure includes immersion in BOE at a concentration of $\text{HF}:\text{H}_2\text{O}=1:10$, and semi-conductor preparation process of pattern etching (size and shape).